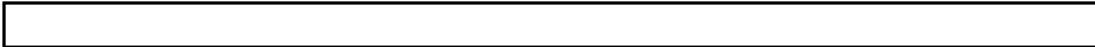


STAT

ELECTROPHOTOGRAPHIC PROCESSING TECHNIQUESCONTRACT  TASK ORDER NO. 03(100,762)65-R

This is the third of a series of monthly narrative reports on a study of electrophotographic processing techniques. The study comprises the investigation and development of photographic and electronic techniques for processing photographic images. This report covers the work performed by

 during the period from 22 August to 22 September 1965.

A. Current Status of Work1. Photographic Processing

The key to photographic processing will be control of acutance and granularity by adjustment of density thresholds, expansion and contraction of densities, and variation of the illuminating spot from a modulated-light source. Most of the special test equipment required to perform these tasks has been received and installed in the new photographic laboratory. These improved facilities are now operational.

Calibration of the test equipment has begun with the microdensitometer, isodensitracer, and microscope photometer. This phase of the study is required to reproduce experimental results and to properly relate the findings to the photographic community. The effort will continue to call upon the pertinent experience of the National Bureau of Standards.

Declass Review by NGA.

Construction of the modulated-light contact printer is nearly complete. Most of the electronic components are assembled on a standard equipment rack. The kinescope yoke driver and its associated power supply have not yet been received from the manufacturer. Also, the exposure control counter, whose modification was necessitated by a change from phase-locked to crystal-controlled master oscillators, is still not completed. Delivery of the modulated-light contact printer to the photographic laboratory should occur before the end of the next monthly period.

Densitometry/microdensitometry and GEMS/Edge-GEMS were the subjects of useful discussions between project personnel and technical representatives of the Contracting Officer and the National Bureau of Standards. These talks are expected to aid in the calibration of photographic materials and equipment. Further exchanges of information with members of the photographic community are planned for the future.

## 2. Electronic Processing

The key to electronic processing, analogous to photographic processing, will be separate and simultaneous operation on the high and low frequency information in the photographic images. Breadboard equipment to evaluate critical aspects and demonstrate operating principles of the proposed two-kinescope processing system has been assembled and operated. Orderly modifications of the equipment are being made as required.

An improved multiplier phototube  and circuit have been incorporated into the breadboard system. Signal-to-noise ratios of

STAT

15-25 db have been obtained with the flying-spot scanner, a transparency of average density, and undeveloped film in contact with the transparency. Best results were obtained with type SO-3404 film; type SO-2427 film produced the lowest signal-to-noise ratios. The system exhibits a flat video characteristic to 20 megacycles per second and maintains stability with full amplifier gain.

Feasibility of the proposed electronic processing system having been demonstrated, two [ ] high-resolution kinescopes and associated mounts, coils, yokes, and yoke drivers were ordered. The [ ] tubes should be delivered within four months. (This delay was incorporated into the original program schedule.) The present breadboard system can provide useful results until that time; the coarse-spot kinescopes are compatible with test GEMS, whose maximum resolution is of the order of 25 cycles per millimeter.

**B. Problem Areas Encountered**

**1. Photographic Processing**

- a. Some delays in delivery of special test equipment are being experienced. Efforts to speed-up delivery of the Dekagon micro-copy camera are being pursued.
- b. Electric power line fluctuations are being reflected in density and transmittance measurements. Additional power regulation will have to be provided in the photographic laboratory (during the next monthly period).

**2. Electronic Processing**

While a signal-to-noise ratio of 25 db is sufficient for most television applications, it may not be adequate to perform some of the

proposed electronic processing (e.g., high-frequency peaking). Experiments will be performed to resolve this problem.

### C. Projected Work for Next Monthly Period

## 1. Photographic Processing

- a. Continue calibration of the special test equipment.
- b. Continue investigations of the intensity/density properties of preselected films and available film chips.
- c. Continue investigation of GEM and Edge-GEM parameters and uses.
- d. Complete construction of the modulated-light contact printer.

## 2. Electronic Processing

- a. Continue measurement of the breadboard system characteristics.
- b. Perform system modifications as required.
- c. Continue design of the high-resolution electronic processing system.

Preparation of the First Interim Technical Report will be completed during the next monthly period.

### D. Status of Fund Expenditures to End of Monthly Period

**Funds expended at break-even level to 26 September 1965:**

--

STAT

STAT

- E. Documentation of Verbal Commitments and/or Agreements During the Period  
Wherever possible, Edge-GEMS will be employed in initial evaluations of the photographic and electronic processing systems.